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# OUTDOOR RECREATION RESEARCH ON NATIONAL FORESTS IN REGION 2: A PROJECT ANALYSIS AND WORKING PLAN

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OUTDOOR RECREATION RESEARCH ON

NATIONAL FORESTS IN REGION 2

By

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A PROJECT ANALYSIS AND WORKING PLAN

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# OUTDOOR RECREATION RESEARCH ON NATIONAL FORESTS IN REGION 2

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## A PROJECT ANALYSIS AND WORKING PLAN

### INTRODUCTION

This analysis is preliminary in scope. It is designed to provide a springboard for an Outdoor Recreation Research program and to form a basis for the selection of studies to be undertaken in the near future.

Two documents furnished the basis for this analysis; S. T. Dana's 1957 "Problem Analysis for Research in Forest Recreation" and 1958-59 sub-regional multiple use plans prepared by the staff of U.S. Forest Service Region 2. No special surveys were conducted to provide information for the analysis.

Certain peculiarities exist in the recreational use of Region 2 forests which, either do not exist elsewhere in the Western States, or are characterized by the climate, terrain, and location of population centers. Many people visit and some relocate in the Central Rocky Mountains to take advantage of the region's recreational opportunities. Thus, use of one kind or another is of short duration but frequent. Such use involves a 12-month period as it shifts from picnicking to fishing, to hunting, to skiing. This use is intensified during the summer months by users traveling greater distances whose visits are of long duration but infrequent.

Recreation is an important forest use and impinges upon other forest uses, timber production, water yield, game and livestock grazing, to the extent that it must be managed and administered in relation to the regional and local importance of these uses. Under multiple use management, recreation takes it's place beside the other forest uses, is considered within the content of all uses, and seldom is the exclusive use.

Visitor day's use of the National Forests in Colorado, Wyoming, South Dakota, Nebraska, and Kansas is increasing at a rate faster than increases in population (figure 1.). Population increases provide a potential demand for outdoor recreation on National Forest lands but other factors are more responsible for the acceleration of the public's present-day use of these lands. These factors are (1) more leisure time available (paid vacations, for example), (2) greater disposable income and (3) improved ease of traveling, especially by modern highways and automobiles. Likewise, these factors play an important role in encouraging out-of-State visitors to travel to the Rocky Mountains, thus contributing to the acceleration of use.

The need for research becomes apparent when one contrasts the accelerated recreational use of forest lands with the other established forest uses. The impact of recreation on these uses creates problems of adjustment requiring new knowledge that will continue to conserve the very resources responsible for the public's desire for outdoor recreation.

## PRESENT RECREATIONAL AND SCENIC OPPORTUNITIES

By the turn of the century, the forests of the Central Rocky Mountain Region were used extensively by local residents for fishing, hunting, excursions by now abandoned narrow-gage trains, and general

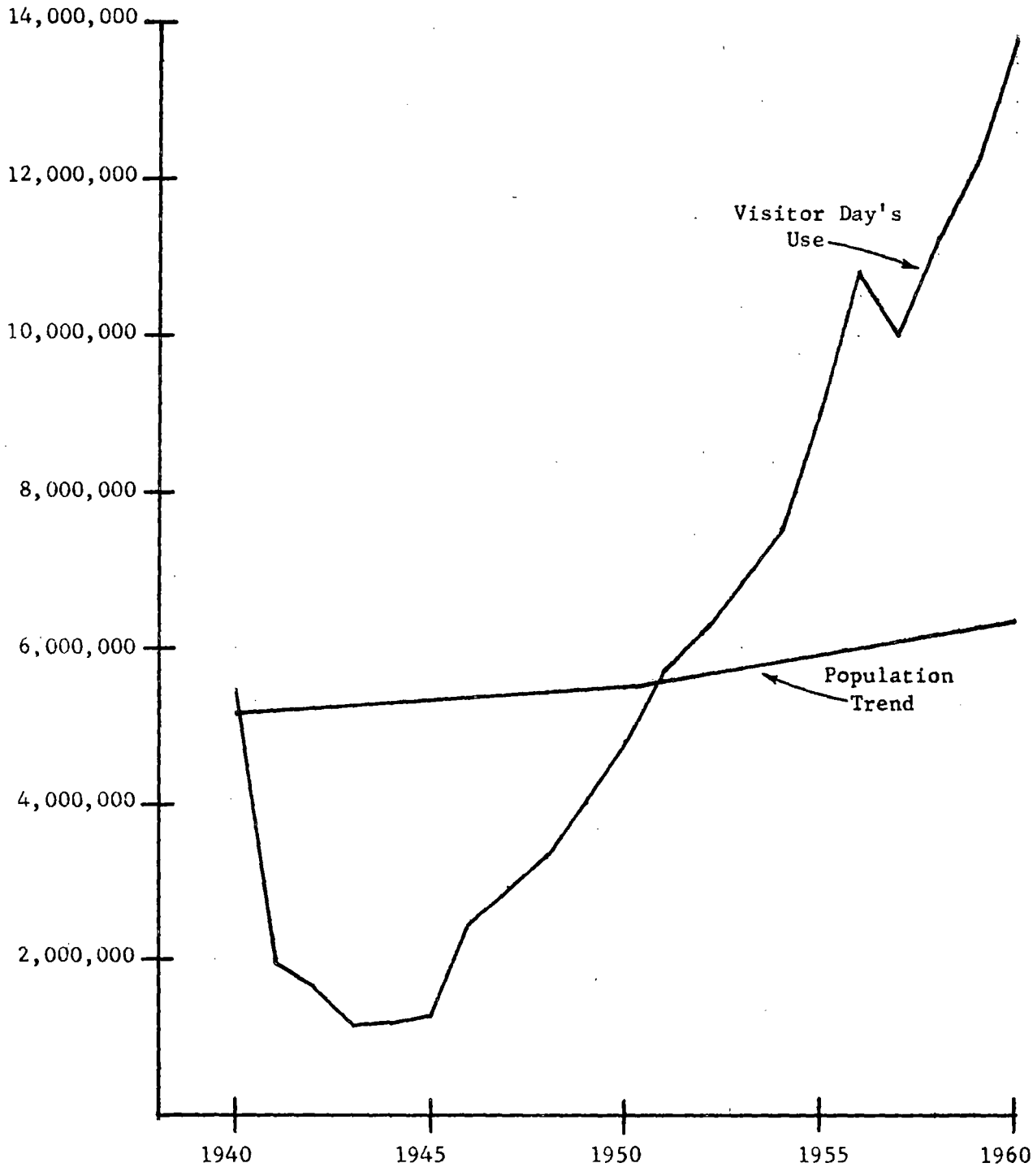


Figure 1.--Total population and visitor day's use of National Forests in five States.

enjoyment. With the advent of the automobile and the development and improvement of highways, this recreational use has extended to residents outside the region so that today it is difficult to segregate the 16 million visits to National Forests between regional and nonregional visitors. Primarily these visits have come about because of the magnificant scenic beauty of the Rocky Mountains with its associated invigorating climate.

Modern highways, tourist accommodations, scenic drives, development of winter sports areas and water supply reservoirs have made the mountains and forests available for recreationists year-round. Many mountain communities, dude ranches, summer and winter resorts have oriented their economy around the tourist trade. Outstanding attractions within the region other than the National Forests (Figure 2) include National Parks and Monuments, Indian Reservations, wildlife refuges, city, county, and State parks, mountain and plains lakes and reservoirs, well-stocked mountain fishing streams, abandoned mining towns, high elevation ski runs, and wilderness areas. Many of these attractions are located on or adjacent to National Forest lands.

The distribution of National Forest lands in the region is such that they provide a base for recreationists to visit scenic points of interest, fish, hunt or boat. The use of National Forest recreation sites is closely related to and intimately tied to the recreational opportunities of the region. For example, a summer's vacation in high elevation forests is enriched by the availability of a National Forest recreation site near a rushing mountain stream or man-made lake; a summer's trail ride to a wilderness area is enhanced by well-kept trails and a satisfying aesthetic environment.

National Forest recreation sites are largely dispersed throughout the forests and are located with reference to points of interest on accessible sites for the convenience of the public. Effort is made to avoid overcrowding by limiting the development density to 3 units per acre and by establishing another site in the nearby vicinity or enlarging a present site, rather than by increasing the density of units. In contrast, picnic sites are severely restricted at National Parks and Monuments, wildlife refuges, State and city parks, and where campsites are developed, the density of 5 to 10 units per acre is used. To some extent National Forest recreation sites alleviate the crowded conditions of National Park and Monument sites particularly where the former are located along approach roads.

State and local governments have been active in programing and developing recreation areas, particularly in connection with their water supply reservoirs. Progress along these lines has been limited to the availability of funds, not to the lack of recognition of public recreation needs.

State Game and Fish Departments have been active in developing and improving water impoundments for fishing purposes. Where these developments are located on National Forest land, the Forest Service is asked to develop and administer recreational facilities for public use at the reservoir sites. This has also been true where Bureau of Reclamation reservoirs have been located on National Forest lands.

Several wildlife refuges have been established by the Fish and Wildlife Service and by State governments and are located in connection with National Parks, isolated mountain masses, or suitable wildlife habitat requirements. Private capital has usually provided recreation facilities at these locations.

The trend toward year-round use of the National Forests is becoming more prevalent each year. This use is fostered by local winter resorts as well as by Chambers of Commerce who advertise extensively the desirability of winter vacations. This has created a demand for more high elevation winter sports areas; the most desirable sites usually occurring on National Forest lands. Forests at higher elevations are not only receiving an increasing volume of recreation use during the winter months through greater public participation in winter sports, but also through scenic drives on roads now kept open.

In summary, present Rocky Mountain recreational and scenic opportunities are centered around the forests and mountains with some characteristics not found elsewhere in the United States and are available for year-round enjoyment. Public recreational developments are designed to take advantage of the modern transportation facilities, climate, outstanding forest environments, streams and lakes, and the historical landmarks of western culture.

The problem of sustaining the recreational and scenic opportunities becomes acute in view of the growing demand of other uses on limited resources. This requires a management base upon which to accommodate all uses so that the limited resources will continue to provide the recreational opportunities characteristic of the region. When considering recreational needs and opportunities, it is important to recognize regional characteristics.

## REGIONAL CHARACTERISTICS

The subregional multiple use plans for the forests in Region 2 reasonably well coincided with recreational use zones. Distances from centers of population serve as a basis for delineating use zones. (Report of California Outdoor Recreation Commission.) A one-way distance of about

40 airline miles from a center of population was found to be the average distance people would travel for a day's outing. Travel distances greater than 40 airline miles usually involved overnight stops of one or more night's duration. Day use zones were outlined on a map of Region 2 forests for towns and cities of 5,000 or more population that were located in the plains east of the mountains in Colorado. All of the National Forests east of the Continental Divide in Colorado fell into a day use zone. This zone covers the same forests described in the Eastern Colorado subregional multiple use plan. As a consequence, the forests of the region were grouped into four subregions that fitted well into recreational use zones (figure 2.). The four subregions are:

1. Eastern Colorado
2. Western Colorado
3. Eastern Wyoming
4. Black Hills

Eastern Colorado Subregion

This subregion includes Eastern slope National Forest lands and National Grasslands in Colorado and Morton County, Kansas (figure 2.). There are 3,132,589 acres of National Forest lands and 742,746 acres in National Grasslands. Elevations range from 3,400 to 14,430 feet and annual precipitation varies from 13 to over 50 inches. Two major rivers, the Arkansas and South Platte originate on National Forest lands and provide about 2 million acre-feet of water annually that is principally used for irrigation.

The greatest population in Region 2 is in this subregion concentrated just east of the National Forests. The estimated population of 1,550,000 is growing at the rate of 3,000 per month. Stimulating this growth is the

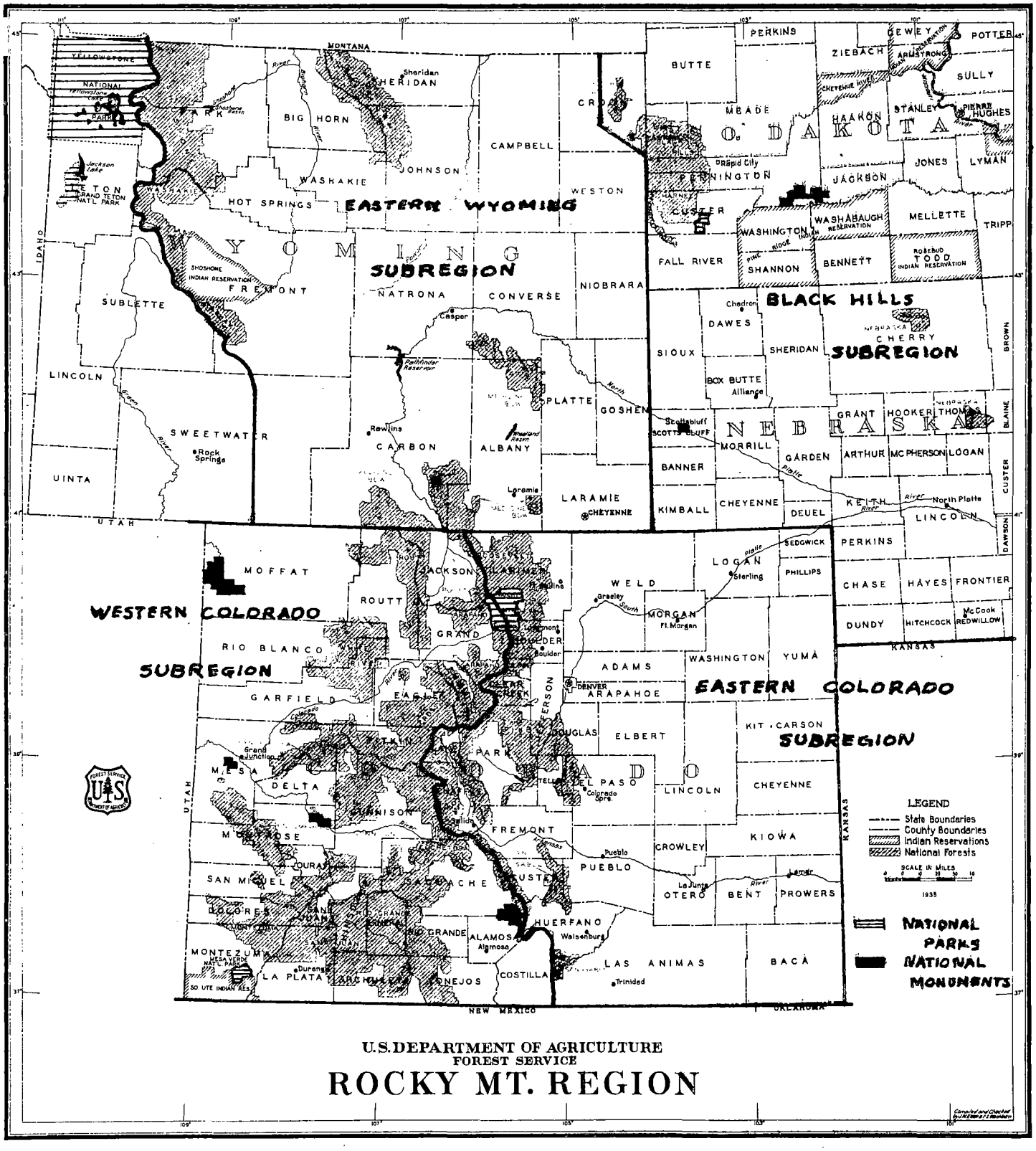


Figure 2.--Subregions of U.S. Forest Service - Region 2

establishment of manufacturing enterprises. Projections indicate that between 1958 and 1975 population will increase 40 percent. Migration of people to this subregion is predominately from the Midwest and from nearby States to the south.

National Forests in the subregion furnish annually 65,000 cow months and 61,000 sheep months of grazing. About 1-1/2 million acres of National Forest land produce timber. The allowable annual cut is 36 million board feet. Wildlife in the subregion attracts nearly one-fourth of the big game hunting and fishing, and one-half of the small game hunting in Region 2. Hunting and fishing demand is ample to control and harvest numbers of big game and fish by manipulating length, time, and type of season. Located within the forests of this subregion and intermingled with forest land are 797,000 acres of State and private land. This represents 21 percent of the National Forest gross acreage.

Recreation on National Forests in the subregion totaled more than 7-1/2 million visits in 1961. This is 46 percent of the total recreation visits in Region 2. Recreation pressure in the subregion is great because of the large adjacent population. Also it includes the first major mountain mass occurring west of the Plains and Prairie States. It is anticipated that recreation pressures will continue to pyramid in this subregion as the population increases and becomes more mobile. The bulk of the National Forest lands are within 40 airline miles of the centers of population. Most of the visits are for one day or less.

The present high recreation demand in this subregion has overtaxed facilities at recreation sites located along stream sides and lake shores to the point where serious conflict exists with water quality. Only minor

conflicts occur with timber, range and wildlife uses. A major need appears to be one of resolving the impact of recreation use on water resources.

Western Colorado Subregion

This subregion includes the National Forest lands in Colorado west of the Continental Divide (figure 2). There are about 10,000,000 acres of land within the National Forests. Elevations range from about 3,000 feet to well over 14,000. Annual precipitation varies from less than 10 inches to over 50. Three major rivers originate in the subregion; the Rio Grande, the Colorado, and the North Platte. About 12 million acre-feet of water is yielded annually from National Forest lands. The bulk of the water is used for irrigation and domestic supply many miles from its source both in eastern Colorado through transmountain diversions and in adjoining States.

At present, the population of the subregion is about 250,000. By 1980 it is anticipated that it will be about 360,000. The major factor that will affect population growth during the next 20 years is the development of industries concerned with oil-shale, manufacture of timber products, and expansion of oil and gas fields.

National Forest range is important in the subregion since it presently furnishes 369,000 cow months and 997,000 sheep months of summer grazing. These summer ranges form a vital part in the year-round operation of local ranches. There are about 5 million acres of commercial timberland in the subregion. The annual allowable cut is 183 million board feet. Much of the commercial timber stands is over mature and is subject to attack by insects and disease. The subregion supports deer and elk in large numbers and bear and big horn sheep in smaller numbers. Despite liberal hunting seasons and bag limits, and improved access, many key winter range areas remain overpopulated by big game.

In 1958 the National Forests of the subregion provided 1.5 million man-days of hunting and fishing. Seventy-five percent of the big game hunting on Colorado National Forests is in this subregion. In 1957, 85 percent of the Colorado deer kill and 90 percent of the elk kill occurred in the subregion. Thirty-two percent of the hunting is by nonresidents of Colorado and 31 percent is by hunters residing in the Eastern Colorado subregion.

Located within the forest boundaries of the subregion and intermingled with National Forest lands are 852,000 acres of State and private land. This amounts to 7-1/2 percent of the National Forest gross area.

Recreation on National Forests in the subregion totaled about 3.3 million visits in 1961; this was 20 percent of the total recreation visits in Region 2. Winter sports area use totaled 628,100 visits. It is estimated that recreation use will increase 3 times by 1970 due to population increases and improvement in transportation facilities. Best estimates indicate that recreation use now exceed the safe capacity of existing sites and facilities by 75 percent. Only the western fringe areas of National Forest lands are within 40 airline miles of the local centers of population. It would appear that the bulk of the recreation use of the National Forest land in the subregion includes overnight visits of one or more days duration. This picture may change to more day use when an inter-State highway with a Continental Divide tunnel is built.

Recreation use in this subregion is limited by accessibility rather than by opportunities for it already contains outstanding hunting and fishing grounds, several well developed winter sports areas and vast vistas of mountain scenic beauty. Yet other uses of water supply, timber harvest and livestock grazing are well established and important regionally and

locally. To meet the recreation demand two needs are paramount, (1) the provision of facilities to accommodate recreationists and (2) the early resolution of conflicts between recreation use and other forest uses.

Eastern Wyoming Subregion

This subregion includes National Forests (exclusive of the Black Hills) and grasslands east of the Continental Divide in Wyoming (figure 2). The public land within the National Forests amounts to 4,609,078 acres and in the National Grasslands 573,386 acres. Elevations range from 5,000 feet to 13,785 feet at Gannett Peak in the west. Yearly precipitation varies from 10 inches to over 30 inches in the mountains. The subregion forms the headwaters for eight rivers that make up a part of the Missouri River system. About 5,750,000 acre-feet of water is yielded annually from National Forests and grasslands. The water is used for irrigation, industries, and cities within Wyoming and in adjacent States to the east.

The population amounts to about 350,000 people. Wyoming is one of the lowest States in population density per square mile. The population is largely rural and small town; there are no large cities. Industrial development will be a major factor in any population increases. Population increases have averaged about one percent per year.

National Forests in the subregion furnish annually 173,000 cow months and 328,000 sheep months of grazing. National Grasslands provide yearly about 110,000 cow months and 26,000 sheep months of grazing. Both ranges are important in the year-round operation of local ranches. There are 1,642,000 acres of commercial timberland with an allowable cut of 80 million board feet. Indications are that the present sawmill capacity will

need to be doubled in order to harvest the allowable cut. Many overmature stands of lodgepole pine are heavily infested with mistletoe and stem canker. The National Forests and Grasslands support a large population of big game animals. Winter range is a limiting factor in big game carrying capacity.

Wildlife in the subregion attracts over 20 percent of the big game hunting and 10 percent of the fishing in Region 2. The percentage of non-resident hunters and fishermen is high. This trend is expected to continue. In some areas access is an important factor in proper wildlife harvest.

There are about 400,000 acres of State and private land within the exterior boundaries of the National Forests and Grasslands in the subregion.

Recreation on National Forests in the subregion totaled more than 2-1/2 million visits in 1961. This is 16 percent of the total recreation visits in Region 2. Areas adjacent to the larger population centers receive heavy recreation use since a major portion of the population depends upon National Forest areas for recreation. Recreational use, local and out of State, is expanding rapidly. From 1946 through 1957, there was 173 percent increase in recreational use. In the years 1946 through 1957, the number of visitors to Yellowstone National Park increased 96 percent. This increased use of the Park has a direct influence on the use of adjoining National Forest lands. The bulk of the recreational visits on National Forest lands appears to be for a day or more because of the travel distances involved.

As in the case of the western Colorado subregion, recreation use in the eastern Wyoming subregion is limited by accessibility rather than by opportunities. It contains outstanding hunting and fishing areas, is adjacent to the world famous Yellowstone National Park and has many points of historical interest. Similarly, other forest uses are well established and

important regionally and locally. To meet the recreation demand two needs are paramount; (1) the provision of facilities to accommodate recreationists and (2) the early resolution of conflicts between recreation use and other forest uses.

Black Hills Subregion

This subregion includes the Black Hills of South Dakota and Wyoming and the National Grasslands in South Dakota (figure 2). There are 1,217,892 acres of National Forest lands and 726,395 acres of National Grassland. Elevations range from 1,800 feet in the plains to 7,240 feet in the Hills. Average annual precipitation varies from 17 to 28 inches with over 60 percent occurring during the summer months. In the plains surrounding the Hills, average annual precipitation is 14 inches. The subregion lies within the Missouri River Basin. The two main tributaries are the Belle Fourche and Cheyenne Rivers. Water originating in the Black Hills is used for municipal and rural supplies, irrigation, and industry. The demand for water has steadily increased during the past 10 years.

The population of the Black Hills approximates 88,000; by 1965 it is expected to be 96,000. Major changes in the rural-urban population have characterized the subregion since 1930 when 33 percent of the residents lived on farms or ranches. The percentage dropped to 14 percent by 1950. There has been a marked increase in manufacturing establishments following World War II. This has been a major factor influencing the urban population and it is expected that industries will continue to exert this change.

The National Forest in the subregion annually furnishes 97,000 cow months and 34,000 sheep months of grazing. The National Grasslands provide yearly 248,000 cow months and 44,000 sheep months of grazing. The latter contribute substantially to the year-round operation of local ranches. On

the National Forest there are 623,000 acres of commercial timber and 228,000 acres of pole stands. Stands of reproduction cover an additional 205,000 acres. The allowable cut for sawtimber is 60 million board feet and 41 million board feet of products less than sawtimber size. Serious insect infestations are common in all timber stands. Fire risks and hazards are high during the spring and fall months. In 1958 man-caused fires accounted for 30 percent of all fires. A large population of big game animals is found on the National Forests and Grasslands. Hunting and fishing amply control the harvest of game and fish through the manipulation of length, time, and type of season, but many key winter ranges remain overpopulated by big game.

Located within the forest boundaries and intermingled with public lands are 307,132 acres of State and private lands. These represent 20 percent of the National Forest gross area and occur along stream bottoms and on hill slopes as homesteads and mining claims. Fifty-four percent of the National Grassland is State and private land of a checkerboard pattern.

Recreation of the National Forests totaled 2.9 million visits in 1961. This represents 18 percent of the total recreation visits in Region 2. The Black Hills is an ideal recreation spot not only for local people but also for people living in adjoining States. Many local attractions exist in the form of national monuments and historical points of interest. The area is also a favorite stop-over spot for many tourists whose destinations are Yellowstone and Glacier National Parks, the Pacific States, and Canada. Recreation use continues to pyramid in accordance with local and regional population increases. Existing recreational improvements are inadequate to meet present demands. Recreational use of the National Forests is both local and regional. The bulk of the lands are within 40 airline miles of the centers of population. Local use is frequent and of short duration while

regional use is of long duration and infrequent.

The present recreation demand in this subregion has overtaxed facilities at recreation sites to a point where serious damage has occurred to resources and conflicts have arisen between timber harvesting, game and livestock grazing, and recreation. Major needs appear to be (1) alleviation of recreation impact on resources, (2) provision of facilities to accommodate recreationists, and (3) resolution of the conflicts between recreation and other forest uses.

## SUMMARY OF OUTDOOR RECREATION PROBLEMS BY SUBREGIONS

Each of the four subregions has a different pattern of recreational use. This difference places emphasis on the diversity of outdoor recreation problems and their urgency of solution. Thus, a single problem occurring in one subregion may or may not occur in another. If it does, it may not require solution in the same time period. Present recreational use of the forests in the four subregions varies according to climate, accessibility, associated points of interest, location of major centers of population, and presence or absence of game and fish. These factors have a direct bearing on the recreation research needs for each subregion.

To segregate the outdoor recreation problems for the forests in the subregions, a priority system was employed. This system first considered the recreation research problems recognized by Dana as they applied to each of the subregions. This was followed by consideration of problems of subregional importance dictated by patterns of recreational use. On a subjective basis, priorities were assigned to each outdoor recreation problem based on the characteristics of each subregion as described in the foregoing general statement.

Table 1 summarizes the priority of outdoor recreation problems recognized in each subregion. In initiating a recreation research program, the selection of those problems to be attacked first is important. Table one points up three problems that are significant and which warrant early consideration. These are:

a. Problems of various kinds and concentrations of recreational use on existing and new recreation sites.

b. Problems of the compatibility of timber utilization, range and wildlife management on recreational uses.

c. Problems of location, layout, design, and equipment for recreational sites.

Of the remaining problems, one appears important in the eastern Colorado subregion. It deals with problems relating to the concentration of recreational sites on watershed conditions.

## RELATED PROBLEMS ON REGION 2 FORESTS

Several problems occur on the forests of Region 2 that are related to recreation research but not a function of it. Principally these problems deal with forest protection and to some extent are influenced by recreational use. They apply particularly to recreation areas but are not confined to them.

The related problems are:

1. Problems connected with early identification of trees and other plants particularly susceptible to attack by insects and diseases.

2. Problems relating to the control of avalanches in winter sports areas.

Table 1. Priority by subregion of outdoor recreation problems on forests of Region 2.

| Problems | Priority by Subregion: East Colo. | West Colo. | East Wyo. | Black Hills |
|---|---|---|---|---|
| Problems of various kinds and concentrations of recreational use on existing and new recreation sites | 1 | -- | -- | 1 |
| Problems of the compatibility of timber utilization, range and wildlife managment on recreational uses | -- | 2 | 2 | 3 |
| Problems of hunter use and hunter supervision | -- | 3 | 3 | -- |
| Problems of location, layout, design and equipment for recreational sites | 3 | 1 | 1 | 2 |
| Problems relating to the concentration of recreational sites on watershed conditions | 2 | -- | -- | 4 |
| Problems relating to recreational use and human behavior | 5 | -- | -- | -- |
| Problems of personal and social values resulting from recreational use | 4 | 4 | 4 | 5 |

3. Problems dealing with recreational use as a cause of forest fires.

4. Problems of increased recreational use on watershed restoration projects.

5. Problem of combining an educational program with recreational use of the National Forests.

6. Administrative problems of recreational areas such as sanitation, layout systems, type and quality of facilities, management of wilderness areas, and the compatibility of different recreational uses on the same site.

Other problems of a general nature are those dealing with inventories of recreational sites on National Forest lands, present and potential demands for different kinds of recreational facilities, cooperation with other agencies to determine areas of responsibility and to organize opinion surveys of public attitudes. Problems of this sort are inherent in any program; consequently, they are not given specific consideration here.

## OUTDOOR RECREATION RESEARCH PROGRAM RECOMMENDATIONS

The seven problems occurring on the forests of the subregions are recommended for study by Research. Inherent in each problem are several individual studies. These studies relate to the overall problem. A detailed description of the seven problems on which studies are recommended follows:

1. Problems of various kinds and concentrations of recreational use on existing and new recreation sites.

   Problems relating to the optimum number of picnic or camp units to be placed in a delineated area under Rocky Mountain conditions of soils and vegetation are widespread throughout the National Forests. Information is needed on the patterns and

intensities of use of recreation sites as affected by such factors as weather, location and arrangement of facilities, time of day, and age and sex of the users. This information will aid in evaluating potential sites and in deciding the type of advanced preparation needed. To expand and maintain optimum recreation use, problems exist on what species or combination of species of grasses, shrubs, and trees will or will not thrive under heavy recreational use. Also, problems relating to soil types are prevalent; kinds, density, volume, and vigor of vegetation they will support; and the effect soil compaction has on soil stability and vegetation. Solutions to these problems will aid in determining what the permissible recreational use load is on the limited number of desirable sites.

2. Problems of the compatiblity of timber utilization, range and wildlife management on recreational uses.

Problems occur dealing with the development of opportunities for additional recreation through timber harvest, wildlife management, water development, and other resource activities under Rocky Mountain conditions. Solution of these problems will lead to the development of general planning guides outlining how to effectively and efficiently integrate forest recreation with other forest uses through multiple use management plans. The point at which recreation use conflicts with one or a combination of other uses such as timber harvest, grazing, wildlife, and water, needs to be determined. The use of sanitation cuts to enhance the forest environment,

to control forest insects and diseases, and to improve the aesthetic setting of a recreation site are related problems.

3. Problems of hunter use and hunter supervision.

Major problems of hunter use and supervision exist on the National Forests. These center around increasing game kill, improving hunter enjoyment, reducing trash and vandalism, and protecting other resources. In many localities hunter use is a major part of the total annual recreation use. It is concentrated into a short period each year. Traditionally this use is without supervision and is largely dispersed outside designated campgrounds. Supervision of game laws is a State responsibility, but occupancy and resource protection is a National Forest problem. Associated problems are the characteristics and desires of hunters, how best to provide for them, type of equipment used, means of dispersing hunters to obtain more uniform game harvest, and fire prevention.

4. Problems of location, layout, design and equipment for recreational sites.

Studies involving the criteria for the location, layout, design and equipment of recreational sites of different kinds are needed. Such information will be helpful in determining what the requirements are for recreation sites in different vegetation environments. Such studies should include determination of the species, sizes, and distribution of trees, shrubs, and herbs that should be used both in the layout of new areas and the rehabilitation of wornout areas. Studies of the most

effective designs and materials to use in the construction of recreational facilities such as tables, grates, toilets, garbage containers, barriers, and water supply and sewage disposal systems are important.

5. Problems relating to the concentration of recreational sites on watershed conditions, including municipal watersheds.

In the planning and development of camp and picnic grounds the tendency has been to locate them in a series along a stream or to group them on open bench-like areas. Information is needed on the effect that individual camp and picnic grounds, located in waterfront and nonwaterfront zones, have on water quality through the deposition of sediment and other debris in the stream channels. Existing problems on municipal watersheds are: the effect of camp and picnic grounds on water quality, and the extent to which this influence affects recreation opportunities and water supplies.

6. Problems relating to recreational use and human behavior.

To further recreational use of forest lands, studies are needed to determine the motives that influence a person in desiring a certain kind of recreation; the reasons why he behaves as he does while engaged in recreational activity; the influence of different kinds of recreational experiences on an individual's physical, mental, and moral conditions, and their effect on him as a citizen in the society in which he lives.

7. Problems of personal and social values resulting from recreational use.

Forest recreation is one of the most effective means of promoting personal development physically, mentally, and

morally. Specific questions to be answered are: Will recreational experiences in a forest environment improve our physical and mental health enough to reduce the steadily growing cost of medical services, hospitals and mental institutions? Will they reduce juvenile delinquency so that we will need fewer detention homes and industrial schools? Will they help to make the individual a better human being and a more effective member of society?

All of the problems recommended for research study will require the development of procedures and techniques to adequately measure the various factors involved in each problem. For example, there is need for reasonably reliable statistics on the kind and volume of recreation use on recreation sites and areas. Reliable statistics are needed to facilitate planning, organization, financing, and other phases of recreation administration. The testing of methods may require the first few years of a particular recreation research study. Although the solution of all seven problems occurring in the subregions merits early attention, the task is too great to undertake them all immediately.

## STUDIES FOR IMMEDIATE ATTENTION

While it is not the first priority, Region 2 plans to attack the problem of hunter use and supervision in the western Colorado and eastern Wyoming subregions during fiscal year 1962. Pilot studies on four selected ranger districts are to begin in the fall of 1961 and funds have been allotted for that purpose. Research will contribute to this study by collaborating in the development of plans and in the evaluation of the results.

Information is needed on the desires of hunters, type of camping equipment used, location of camp, length of stay, attention to fire hazards, camp cleanup, and factors leading to vandalism. The problem of becoming acquainted with the different kinds of hunter use on developed and undeveloped campsites will lead to the solution of the important problem of providing the desirable facilities for hunter camps.

Another study that will be undertaken immediately by research personnel deals with the patterns of use on selected recreation sites. This study will determine and establish patterns of recreation use on existing recreation sites in order to identify key observations to be made during succeeding studies dealing with methods of measuring recreation use, effects of recreation use on resources, conflicts with other forest uses, site lay-out and design, and the economic, social and personal values of outdoor recreation.

The above two studies are all that will be undertaken at the present time. It is estimated that these studies would involve a total of 5 man months of the time of recreation research personnel.